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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,309	10/06/2003	Mitsue Miyazaki	160-391	4146
23117 7590 03/19/2008 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
KISH, JAMES M				
ART UNIT		PAPER NUMBER		
3737				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/678,309

**Applicant(s)**

MIYAZAKI ET AL.

**Examiner**

JAMES KISH

**Art Unit**

3737

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 2/6/08.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/55/08)  
Paper No(s)/Mail Date 1/30/08
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Licato et al (US 7047062) in view of Dumoulin et al. (US Patent No. 4,714,081), further in view of Nishimura (US Patent No. 4,718,424). Licato discloses an MRI system including an RF coil and gradient magnetic field coils (Figure 1) as well as a pulse generator module **121** and a CPU **119** that controls the gradient magnetic field coils. The gradient magnetic field sequences may be "applied on any physical gradient axes  $G_x$ ,  $G_y$ ,  $G_z$ , or any linear combination thereof, depending on the selected orientation for the slice. The slice select pulse includes, but is not limited to, a slice select pulse, a rephaser pulse, and a killer or dephaser pulse", the phase encoding pulse may be a phase encoding pulse or a phase rewinder pulse, and the readout pulse may be a rephaser pulse, a readout pulse, or a killer or dephaser pulse (column 6, lines 43-59). These pulses may be used for velocity or flow compensation (column 1, line 56).

However, Licato does not describe a processor that performs subtraction imaging. Dumoulin describes a method for using magnetic field gradient and radio-frequency (RF) pulse signal sequences permitting moving nuclear spins to be selectively detected and then displayed as projected angiographic data in a NMR image, without the use of contrast agents (see Abstract). Regarding slice selective signals, RF pulse signals, flow encoding, rephrasing and dephasing pulses, see column 3, line 20 through column 4, line 21. Phase encoding is discussed at column 6, lines 20-35. The difference of the data sets digitized from the acquired NMR response signals **44/44'** is taken to provide the data for the image (column 6, lines 11-14). It would have been obvious at the time the invention was made to utilize the apparatus disclosed by Licato to perform the method described by Dumoulin because Licato states that the pulses may be used for velocity or flow compensation without providing a corresponding method. Furthermore, Licato states that a resulting set of received NMR signals are digitized and processed to reconstruct the image using one of many well-known reconstruction techniques (column 1, lines 29-31) while Dumoulin describes a difference image technique to produce the image.

However, the combination of Licato and Dumoulin does not provide for timing the acquisition of images during the systolic and diastolic periods of the heartbeat in order to use these images in the subtraction. Nishimura teaches this feature at column 7, lines 58-68. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize these precise periods for image subtraction

because the systole image acts as a "mask" image which allows static material to be cancelled from the diastole image (column 7, lines 66-68 of Nishimura).

Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Licato in view of Dumoulin and Nishimura (as described in the rejection of claims 1-14), further in view of Miyazaki et al (2002/0032376). Licato in combination with Dumoulin and Nishimura is described in the rejection of claims 1-14. However, these references fail to disclose the use of a prep scan. Miyazaki discloses a system for MR imaging including the use of a prep scan to determine an optimal condition of imaging parameters (abstract). A prep scan is followed by an imaging scan (figure 2) and determines a condition of the pulses on the basis of the results of the scan, such as the timing of the scan and other imaging parameters (figure 6, step 21). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Licato, Dumoulin and Nishimura in light of the teachings of Miyazaki to include a preparatory scan to obtain optimal parameters for the subsequent imaging scan to provide an improved image.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES KISH whose telephone number is (571)272-5554. The examiner can normally be reached on 8:30 - 5:00 ~ Mon. - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian L Casler/  
Supervisory Patent Examiner, Art  
Unit 3737

JMK